

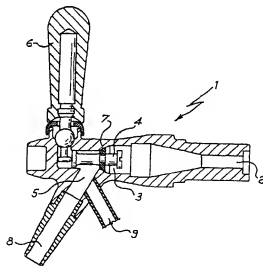
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(54) Title: PLANT FOR DELIVERING LIQUID OR PASTY PRODUCTS



(57) Abstract: A plant for delivering liquid or pasty products comprises at least one delivery tap (1, 10, 17) and means for supplying at least one sterilising and washing fluid inside the plant. The delivery tap (1, 10, 17) is provided with at least one outflow opening (3, 11) for a feed pipe (2, 12) of a product in liquid or pasty form and a corresponding valve (4, 13) for closing said outflow opening (3, 11). The delivery tap (1, 10, 17) also comprises an inlet pipe (9, 16) for the sterilising and washing fluid having its own outlet opening (3, 11) situated close to the product outflow opening, downstream from the valve (4, 13) for closing said outflow opening (3, 11).

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Title: "Plant for delivering liquid or pasty products"

Background Of The Invention

The present invention relates to a plant for delivering liquid or pasty foodstuff products, of the type including means for providing a  
5 sterilising and washing fluid inside the same plant.

The plants for delivering liquid or pasty foodstuff products, such as water, beverages, ice cream or cream, usually include a delivery tap which presents the outflow opening of a feed pipe of the product to be delivered and a gate valve, positioned in correspondence to  
10 the above-mentioned outflow opening, for regulating or interrupting the flow of product coming out of the feed pipe.

Between the outflow opening and the outlet section of the tap, there is usually a chamber, or a nozzle, which directs the flow of foodstuff product towards an external container to be filled. The  
15 foodstuff product consequently flows intermittently through this chamber, which is constantly in contact with the outside environment. The flow of delivered foodstuff product may frequently form sediment on the inside walls of the chamber or the nozzle.

During periods of plant inactivity, for example overnight, these  
20 sediments, in contact with the external environment, cause the formation of germs or bacteria which may contaminate the product to be delivered when the plant is subsequently used.

To guarantee suitable hygienic conditions, in particular for removing these sediments of foodstuff product, a known technique  
25 provides a plant sterilising and washing cycle before each use of the plant.

The sterilising and washing cycle may be carried out using portable equipment for steam generation, simply directing the flow of

steam produced by these appliances inside the delivery tap.

Plants for delivering liquid or pasty foodstuff products are also known which are provided with their own apparatus for sterilising and washing the delivery tap. Such apparatus, for example described in  
5 the European patent EP-B1-0.245.641, usually include a boiler provided by an electric heater for steam generation, means for regulating and timing steam generation, and pipes for delivering steam inside the delivery plant. These steam delivery pipes are usually connected to the feed pipes for the foodstuff product.

10 However, these appliances do not guarantee optimum sterilising of internal surfaces of the tap, and particularly of the tap region including the outflow opening for the foodstuff product. In this region, where there is also the gate valve for closing the outflow opening, the discontinuity of the internal surfaces promotes the deposit of foodstuff  
15 sediment and the consequent generation of germs or bacteria.

Furthermore, the apparatus known from the cited EP-B1-0.245.641 comprises particular safety devices used to control the correct operation of the apparatus that have the purpose of  
20 interrupting the power to the electrical heater of the boiler in case the labyrinth of tubes in the boiler is obstructed at any point, for instance by formation of calcium deposits or other types of scallings.

A main drawback of a similar apparatus is due to the particular complexity of the safety systems that must be provided in order to prevent breakdowns or, still worse, situations of danger due to the  
25 excess of pressure that could develop inside the boiler. Besides having a high cost, a similar system has also shown itself lacking the necessary reliability demanded by operators in the sector. For instance, since the cycle of washing and sterilisation is normally effected in the operator's

absence during normal closing hours of premises, the occurrence of a slight obstruction in the tubes of the boiler doesn't cause any damage, thanks to the complex safety system, but effectively prevents efficient washing and sterilisation of the delivery tap. This fact may not be  
5 readily immediately noticed by the operator, who continues to enable the timed operation of the apparatus without becoming effectively aware that the cycle of washing and sterilisation has not been completed or hasn't been effected at all.

#### Summary Of The Invention

10 An object of this invention is to provide a plant for delivering liquid or pasty products, equipped with means for sterilising and washing the delivery tap, which guarantees optimum conditions for hygienic use of the plant.

Another object of the invention is to provide a plant for  
15 delivering liquid or pasty products which, in particular, guarantees accurate sterilising of the tap region including the outflow opening for the foodstuff product to be delivered.

A further object of the present invention is to produce a delivery plant having a washing and sterilising apparatus that is particularly  
20 simple to construct, that has particularly limited costs and dimensions, and that could be easily integrated into new plants, as well as into existing plants.

Still another object of the present invention is to produce a delivery plant having a washing and sterilising apparatus of the type  
25 described above that is particularly reliable and that requires limited maintenance.

These and other objects are achieved by the delivery plant according to claim 1 and the subsequent dependant claims.

A plant according to this invention includes at least one delivery tap and means for supplying at least one sterilising and washing fluid inside the plant. The delivery tap is provided with at least one outflow opening for a feed pipe of a product in liquid or pasty form and a  
5 corresponding valve for closing the outflow opening.

The delivery tap also includes an inlet pipe for the sterilising and washing fluid, having its own outlet opening situated next to the product outflow opening, downstream from the valve for closing the outflow opening.

10 According to a particular aspect of this invention, the outlet opening of the inlet pipe for the sterilising and washing fluid is set on an oblique axis with respect to the axis along which the product flows, so as to produce a flow of the sterilising and washing fluid towards the region of the delivery tap containing the product outflow opening.

15 Moreover, as an example without limitation, the inlet pipe for the sterilising and washing fluid may be made with taps of the "post-mix" type for the delivery of beverages with postponed mixing, with taps for delivering liquids, or with taps for delivering foodstuff products in pasty form, such as soft ice-cream or cream.

20 According to another aspect of the invention, the sterilising and washing fluid is steam and an apparatus for supplying this fluid includes at least one steam generator, fed by water from a supply source, means for controlling steam generation and means for timing the feeding of steam to the delivery plant. Preferably, the steam  
25 generator is an instant steam generator and the means for controlling steam generation also include a water pressure reducer, located upstream from the instant steam generator.

The combination of a simple pressure reducer with an instant

steam generator eliminates the need for all the safety devices used in the prior art. In fact, an instant steam generator comprises in practice a single straight pipe having a particularly large section, in which entering water is brought quickly to such a temperature as to change  
5 it completely into steam before it reaches the other end of the generator. There can't, therefore, be problems of obstruction in the single duct.

A metering solenoid valve, mounted downstream to the pressure reducer, is thus sufficient to maintain a constant supply  
10 pressure of water upstream of the boiler to obtain particularly reliable operation from the apparatus.

#### Brief Description Of The Drawings

The present invention will now be described, by way of example and without limiting purposes, with reference to some embodiments  
15 illustrated in the attached drawings, in which:

Figure 1 is section view of a tap for delivering a beverage or other liquid product, according to a particular aspect of this invention;

Figure 2 is section view of a tap for delivering a product in pasty form, such as ice-cream, according to another aspect of this  
20 invention;

Figure 3 is a side view of a delivery tap of the "post-mix" type according to a particular aspect of the invention;

Figure 4 illustrates the hydraulic circuit of a washing and sterilising apparatus according to the present invention;

25 Figure 5 illustrates the electrical circuit of a washing and sterilising apparatus according to the present invention; and

Figure 6 is an exploded perspective view of some elements of a washing and sterilising apparatus according to the present invention.

Best Modes For Carrying Out The Invention

Figure 1 illustrates a tap, indicated in general with the reference number 1, for delivering a liquid foodstuff product.

The delivery tap 1, which may be connected to a plant for  
5 delivering beverages of the "pre-mix" type, includes an outflow opening 3 connected to a feed pipe 2 for the liquid product to be delivered and a piston valve 4, equipped with a gasket 7 for closing the outflow opening 3 and thus adjusting the flow of liquid coming out. The feed pipe 2 is in turn connected to a corresponding source of  
10 the liquid product, not represented, and the piston valve 4 may be operated thanks to a control lever 6.

Immediately downstream from the outflow opening 3 is a lamination chamber 5 which, in turn, precedes the outlet section 8 of the tap 1.

15 The delivery tap 1, according to this invention, also includes an inlet pipe 9 for a sterilising and washing fluid, located close to the liquid product outflow opening 3, immediately downstream from the piston valve 4.

In particular, in the embodiment illustrated, the outlet opening  
20 of the inlet pipe 9 is located in correspondence to an internal wall of the lamination chamber 5 and extends along an oblique axis with respect to the vertical, and with respect to the direction of flow of the liquid product, in order to direct the flow of sterilising and washing fluid into the region of the tap 1 comprising the product outflow opening 3,  
25 the valve 4 and the lamination chamber 5.

The inlet pipe 9 is fluidically connected to means for supplying a sterilising and washing fluid, not represented, and possibly to means for supplying a process fluid, that is a detergent and/or disinfecting fluid.

In a preferred embodiment of this invention, the sterilising and washing fluid is steam and the means for supplying this fluid include at least one steam generator, means for controlling steam generation and a device for timing the feeding of steam. In this embodiment the  
5 pipe 9 is connected downstream from the steam generator and may also be in fluid communication with additional means (not shown) for providing a detergent, which are also regulated and timed by suitable control devices.

Figure 2 is a partial view in section of a delivery tap 10 for foodstuff products in pasty form, such as soft ice-cream or cream, according to this invention.

The delivery tap 10 comprises an outflow opening 11 connected to a pipe 12 for feeding the pasty product to a gate valve 13 which can allow or interrupt the outward flow of the pasty product.

15 Downstream from the outflow opening 11 and the gate valve 13 there are a nozzle 14 for delivering the product and an inlet pipe 16 for a sterilising and washing fluid. Inlet pipe 16 is located close to the outflow opening 11 for the pasty product, downstream from the valve 13, before the outlet section 15 of the nozzle 14. In particular, the  
20 outlet opening of the pipe 16 is obtained in correspondence to an internal wall of nozzle 14, immediately below valve 13, and is directed in such a way as to allow the flow of the sterilising and washing fluid towards the valve 13, the opening 11 and the internal walls of the nozzle 14.

25 Advantageously, pipe 16 may be connected to an apparatus for generating steam, such as that disclosed below with reference to figure 4. In this case, pipe 16 is fluidically connected to the exit duct 110 shown in figure 4.



Figure 3 is a side view of a delivery tap 17 of the "post-mix" type according to this invention.

Taps of the "post-mix" type are taps which allow the delivery of beverages which are mixed later, that is of beverages made of two components which are mixed only immediately before delivery of the beverage. Taps for delivering these beverages usually include a "post-mix" valve composed of two feed pipes for the beverage components, at least one valve for closing the two pipes and a mixing chamber located downstream from this closing valve.

Tap 17 of the "post-mix" type in figure 3 comprises a body 18 in which are housed the feed pipes for the beverage components, a mixing chamber 19, a delivering nozzle 20 and a control lever 21 for a "post-mix" valve.

Tap 17 also comprises an inlet pipe 22 for dispensing a sterilising and washing fluid directly into the mixing chamber 19. The outlet opening of the pipe 22 is therefore made along an internal wall of the chamber 19, close to the feed pipes for the beverage components and downstream from the closing valve, lying in such a position as to allow the flow of the sterilising and washing fluid to be directed towards the valve and the feed pipes for the beverage components.

In a preferred embodiment, the sterilising and washing fluid is steam and the steam inlet pipe 22 may be connected to exit duct 110 of a steam generating apparatus, as shown in Figure 4.

With reference to Figure 4, a washing and sterilising apparatus suitable for the use in a plant according to the present invention comprises essentially a pressure regulator 101 to which water deriving from the water pipe network is delivered through a supply pipe 102.

The water leaving pressure reducer 101 is taken through a pipe

103 to a metering solenoid valve 104, if necessary interposing an anti-calcium filter 140 (here shown with broken line) that prevents the possible deposit of scalings, above all in pipe 103 and solenoid valve 104.

5           The water leaving the solenoid valve 104 is taken by means of a pipe 105 to an instant steam generator 106, which delivers steam to an exit duct 110 that will carry it directly to one or more taps of the food product delivery plant as those shown in Figures 1 to 3.

10           Steam generator 106 is equipped in particular with a heating element 107 and a pair of temperature-sensitive devices 108 and 109 that will be described in more detail below.

15           The electric circuit of the apparatus shown in Figure 5 comprises a control circuit 120 acting on the solenoid valve 104 to regulate the cycle of washing and sterilisation. In particular, control circuit 120 comprises a timer which activates the solenoid valve 104 for a predetermined period with a series of opening and closing cycles (ON and OFF states). Maintaining the pressure upstream of the solenoid valve 104 constant, it is thus possible to dose the quantity of water to be transformed into steam with high precision. Knowing that the  
20           period of the pulsating signal controlling the solenoid valve is pre-set generally to one second, it is possible to regulate the quantity of water fed to the steam generator on the basis of the number of ON states of the solenoid valve that occur for the whole duration of the washing cycle.

25           The power supply to heating element 107 of the steam generator 106, as well as being subject to control circuit 120, is also subjected to the control of temperature-sensitive devices 108 and 109. Device 108 consists preferably of a normally-open thermostat that

closes the electric circuit to which it is connected when temperature exceeds a pre-set threshold, for instance between 120 °C and 130 °C. Device 109, on the other hand, consists preferably of a normally closed thermostat, provided with a reset switch, that opens the circuit to which it is connected when the temperature exceeds a pre-set threshold, for instance between 160 °C and 170 °C.

The activation of the apparatus can be effected manually by means of a button 121 each time it is deemed necessary, or can be regulated by a programmable timer 122 that daily activates the cycle of washing and sterilisation during the closing hours of the place in which the delivery plant is installed.

As it is evident from Figure 6, the apparatus is housed in a cabinet 150 that can be mounted on the delivery plant which is to be washed, or it can be an integral part of the same plant. The cabinet 150 comprises one or more detachable cover panels (not shown) to allow access to the inside.

Switch 121 is shown for clarity as located on the outside of cabinet 150, but it is preferably located inside cabinet 150 with only the push button accessible from the outside.

The water inlet consists of a suitable pipe (not shown) attached to a link for flexible pipes 151 that protrudes from cabinet 150. The water supply circuit continues via an union elbow 152 connected in turn to pressure reducer 101, the latter provided with a manometer 111 that indicates the pressure setting. Pressure reducer 101 allows the pressure to be maintained between around 0.5 and 2 bar, and is preferably maintained at around 1.5 bar.

The outlet of pressure reducer 101 is connected to the entry of metering solenoid valve 104 by means of a duct 103 and a pair of

pipe fittings 131 and 132 respectively. The connection between the outlet of the metering solenoid valve 104 and the inlet of the steam generator 106 is via linking pipe 105.

5 In the body of steam generator 106 are housed heating element 107 and two temperature-sensitive devices 108 and 109 already described above. Device 109 is preferably provided with a RESET button 191 that allows its re-activation in the case where the temperature inside steam generator 106 has exceeded a pre-set safety threshold.

10 Outlet aperture 161 of steam generator 106 receives a union elbow 162 that is connected to pipe fitting 163 for flexible pipes. To this pipe fitting 163, protruding outside cabinet 150, is connected a pipe (not shown) that carries the steam to one or more taps of the delivery plant according to the invention.

15 Inside cabinet 150 are further housed control circuit 120 and all the electric wiring (not shown) between the various components of the apparatus, as well as any timer 122 and any anti-calcium filter 140 (not shown in Figure 6). The filter could, for instance, be inserted directly in place of duct 103 or inserted along the same duct, or yet  
20 again between pipe fitting 132 and the metering solenoid valve 104.

As is clear from the above description of some embodiments, the plant for delivering liquid or pasty products according to his invention allows effective sterilisation and complete washing of the delivery tap and, in particular, of the region of the tap comprising the  
25 outlet opening for the foodstuff product.

The effective sterilisation, which may be obtained, for example, by the apparatus for generating steam represented in figure 4, thus guarantees optimum hygiene conditions during use.

## Claims

1. A plant for delivering liquid or pasty products, of the type comprising at least one delivery tap and means for supplying at least one sterilising and washing fluid inside the plant, said delivery tap  
5 being provided with at least one outflow opening for a feed pipe of one of said products in liquid or pasty form and a valve for closing said outflow opening, characterised in that said tap comprises an inlet pipe for said sterilising and washing fluid, the outlet opening of said inlet pipe being placed close to said outflow opening, downstream  
10 from said closing valve.
2. A delivery plant according to Claim 1, wherein said outlet opening of the inlet pipe for said sterilising and washing fluid is set on an oblique axis with respect to the axis along which the product flows, to allow said fluid to flow towards the region of the tap comprising  
15 said outflow opening.
3. A delivery plant according to Claim 1, wherein said delivery tap comprises at least one mixing chamber located downstream from a "post-mix" valve for mixing at least two fluids, said "post-mix" valve comprising at least two outflow openings for said two fluids and at  
20 least one valve for closing said two outflow openings, said outlet opening of the inlet pipe for said sterilising and washing fluid being made in said mixing chamber.
4. A delivery plant according to Claim 1, wherein said delivery tap comprises an outflow opening for a liquid product and a valve for  
25 closing said outflow opening, as well as a lamination chamber located downstream from said outflow opening and said valve, said outlet opening of the inlet pipe for said sterilising and washing fluid being made in said lamination chamber.

5. A delivery plant according to Claim 1, wherein said delivery tap comprises at least an outflow opening for a pasty product and a valve for closing said outflow opening, as well as a delivery nozzle located downstream from said outflow opening and said valve, said outlet opening of the inlet pipe for said sterilising and washing fluid being made in an internal wall of said delivery nozzle.
6. A delivery plant according to Claim 1, wherein said inlet pipe for said sterilising and washing fluid is connected to an apparatus for providing a process fluid.
7. A delivery plant according to Claim 1, wherein said sterilising and washing fluid comprises steam.
8. A delivery plant according to Claim 7, wherein said apparatus for supplying said sterilising and washing fluid comprise at least one steam generator fed by a water supply source through a supply conduit, means for controlling steam generation in said steam generator, and means for timing the feeding of steam to the delivery plant, said inlet pipe for said sterilising and washing fluid being connected downstream from said steam generator.
9. A delivery plant according to Claim 8, wherein said steam generator consists of an instant steam generator and said means for controlling steam generation comprise a pressure reducer for the water coming from a feeding source, said pressure reducer being placed upstream from said instant steam generator.
10. A delivery plant according to Claim 8, wherein said means for controlling steam generation comprise at least one metering solenoid valve located along said supply conduit between said pressure reducer and said instant steam generator.
11. A delivery plant according to Claim 8, wherein at least one

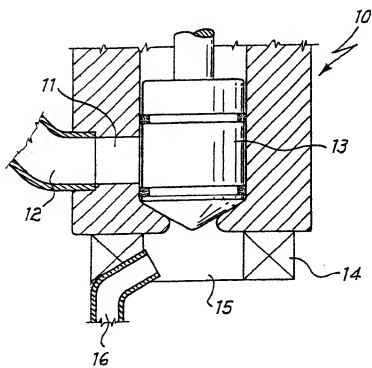
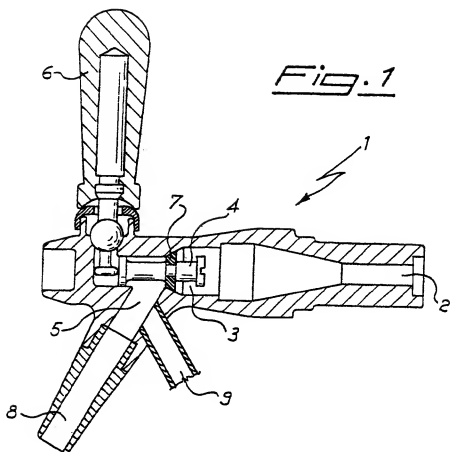
sensor is provided for detecting the temperature in said instant steam generator.

12. A delivery plant according to Claim 8, wherein at least one thermostat is provided to interrupt the power supply to a heating element enclosed to said instant steam generator in the case in which a pre-set temperature is exceeded.

13. A delivery plant according to Claim 9, wherein at least one anti-calcium filter is disposed along said supply conduit between said pressure reducer and said solenoid valve.

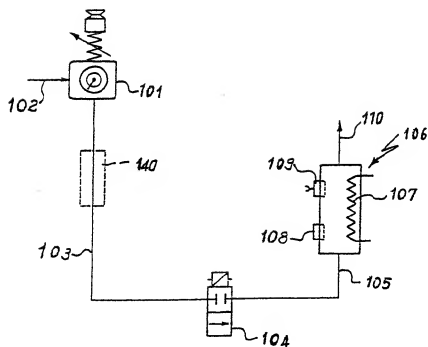
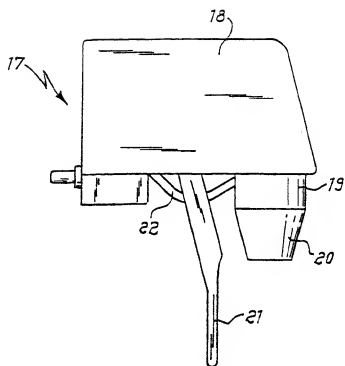
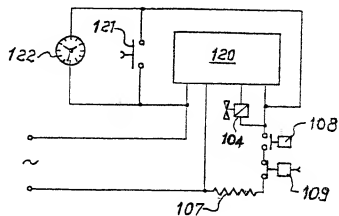
- 10 14. A delivery plant according to Claim 9, wherein said pressure reducer is set up to deliver water to said instant steam generator at a pressure between about 0.5 and 2 bar.

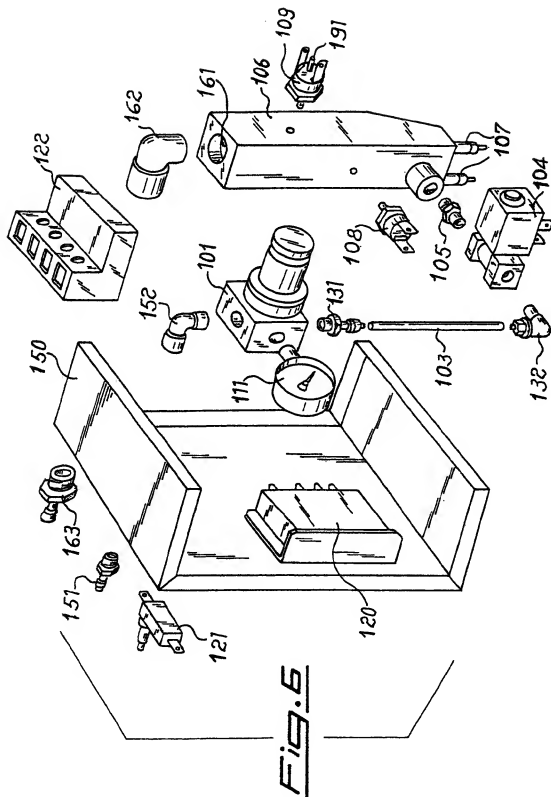
- 15 15. A delivery plant according to Claim 14, wherein said pressure reducer is set up to deliver water to said instant steam generator at a pressure of about 1.5 bar.





2/3

Fig. 3Fig. 4Fig. 5



| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>IPC 7 B08B9/00 B67D1/07  |  |  |
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| According to international Patent Classification (IPC) or to both national classification and IPC  |  |  |
| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br>IPC 7 B08B B67D F22B B05B  |  |  |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  |  |  |
| Electronic data base consulted during the international search (name of data base and, where practical, search terms used)<br>EPO-Internal, WPI Data   |  |  |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>  |  |  |
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| <input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.  |  |  |
| * Special categories of cited documents :<br>"A" document defining the general state of the art which is not considered to be of particular relevance<br>"E" earlier document but published on or after the international filing date<br>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)<br>"O" document referring to an oral disclosure, use, exhibition or other means<br>"P" document published prior to the international filing date but later than the priority date claimed<br>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention<br>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone<br>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art<br>"B" document member of the same patent family |  |  |
| Date of the actual completion of the international search<br>29 September 2000   |  | Date of mailing of the international search report<br>06/10/2000 |
| Name and mailing address of the ISA<br>European Patent Office, P.B. 5616 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016   |  | Authorized officer<br>Van der Zee, W                             |

## INTERNATIONAL SEARCH REPORT

Inter national Application No  
PCT/EP 00/05618

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |  |                       |
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